IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in this application.

1. (Original) A method of creating an atrioventricular bypass tract for a heart, comprising:

growing mesenchymal stem cells into a strip with two ends;

attaching one end of the strip onto the atrium of the heart, and

attaching the other end of the strip to the ventricle of the heart, to create a tract connecting the atrium to the ventricle to provide a path for electrical signals generated by the sinus node to propagate across the tract and excite the ventricle.

2. (Original) The method of claim 1, wherein the steps of attaching are performed by suturing.

3. (Original) The method of claim 1, wherein the stem cells are adult human mesenchymal stem cells.

4. (Original) The method of claim 3, wherein the step of growing comprises growing the stem cells in culture on a nonbioreactive material.

5. (Original) The method of claim 4, wherein the step of growing is performed in an environment substantially free of any additional molecular determinants of conduction.

6. (Original) The method of claim 1, further comprising a step of adding a gene to the mesenchymal stem cells by 35 electroporation.

7. (Original) The method of claim 6, wherein the gene encodes for a connexin.

8. (Original) The method of claim 7, wherein the connexin includes connexin 40.

9. (Original) The method of claim 7, wherein the connexin includes connexin 43.

10. (Original) The method of claim 7, wherein the connexin includes connexin 45.

11. (Original) The method of claim 6, wherein the step of adding a 20 gene by electroporation includes adding alpha and accessory subunits of L-type calcium.

12. (Currently amended) The method of claim 6, wherein the step of adding a gene by electroporation includes adding the gene for connexins ~~connexions~~ and adding alpha and accessory subunits of L-type calcium channel.

13. (Currently amended) Use of mesenchymal stem cells to create an atrioventricular bypass tract for a heart wherein said tract provides a path for electrical signals generated by the sinus note to propagate across the tract and excite the ventricle, comprising growing mesenchymal stem cells into a strip having two ends, whereby one end of the strip is ~~may be~~ attached to the ventricle of a heart and the other end is ~~may be~~ attached to the atrium of the heart to create the atrioventricular bypass tract.

14. (Previously presented) The use of mesenchymal stem cells of claim 13 wherein the mesenchymal stem cells are adult human mesenchymal stem cells.

15. (Previously presented) The use of mesenchymal stem cells of claim 13 wherein the stem cells are grown in culture on a non-bioactive material.

16. (Previously presented) The use of mesenchymal stem cells of claim 13 wherein the stem cells are grown in an environment substantially free of additional molecular determinants of conduction.

17. (Previously presented) The use of mesenchymal stem cells of claim 13 wherein the cells are transfected to express a gene.

18. (Previously presented) The use of mesenchymal stem cells of claim 17 wherein the gene encodes a connexin.

19. (Previously presented) The use of mesenchymal stem cells of claim 18 wherein the connexin is connexin 40.

20. (Previously presented) The use of mesenchymal stem cells of claim 18 wherein the connexin is connexin 43.

21. (Previously presented) The use of mesenchymal stem cells of claim 18 wherein the connexin is connexin 45.

22. (Previously presented) The use of mesenchymal stem cells of claim 17 wherein the gene encodes an alpha and accessory subunits of the L-type calcium channel.

23. (Previously presented) The use of mesenchymal stem cells of claim 18 further comprising transfecting the cells with a gene encoding an alpha and accessory subunits of the L-type calcium channel.

24. (Currently amended) An atrioventricular bypass tract for a heart wherein said tract provides a path for electrical signals generated by the sinus note to propagate across the tract and excite the ventricle, wherein said tract is prepared by a process comprising growing mesenchymal stem cells into a strip having two ends, whereby one end of the strip is ~~may be~~ attached to the ventricle of a heart and the other end is ~~may be~~ attached to the atrium of the heart to create the atrioventricular bypass tract.

25. (Previously presented) The bypass tract of claim 24 wherein the mesenchymal stem cells are adult human mesenchymal stem cells.

26. (Previously presented) The bypass tract of claim 24 wherein the stem cells are grown in culture on a non-bioactive material.

27. (Previously presented) The bypass tract of claim 24 wherein the stem cells are grown in an environment substantially free of additional molecular determinants of conduction.

28. (Previously presented) The bypass tract of claim 24 wherein the cells are transfected with a gene.

29. (Previously presented) The bypass tract of claim 28 wherein the gene encodes a connexin.

30. (Previously presented) The bypass tract of claim 29 wherein the connexin is connexin 40.

31. (Previously presented) The bypass tract of claim 29 wherein the connexin is connexin 43.

32. (Previously presented) The bypass tract of claim 29 wherein the connexin is connexin 45.

33. (Previously presented) The bypass tract of claim 28 wherein the gene encodes an alpha and accessory subunits of the L-type calcium channel.

34. (Currently amended) The bypass tract of claim 33 further comprising transfecting ~~tranfecting~~ the cells with a gene encoding an alpha and accessory subunits of the L-type calcium channel.